

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference GRC 5173	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 00942	International filing date (day/month/year) 15/03/2000	(Earliest) Priority Date (day/month/year) 24/03/1999
Applicant BG INTELLECTUAL PROPERTY LTD.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 : C07C7/152

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 93 01153 A (GUDMUNDSSON) 21 January 1993 (1993-01-21) page 10; claim 1; figure 3 ---	1,4
A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 325, 19 August 1991 (1991-08-19) & JP 03 122497 A (NIPPON DENSO CO), 24 May 1991 (1991-05-24) abstract ---	12,13,15
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 91, 19 April 1985 (1985-04-19) & JP 59 225127 A (TOKYO GAS KK), 18 December 1984 (1984-12-18) abstract --- -/--	22

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

24 July 2000

Date of mailing of the international search report

28/07/2000

Name and mailing address of the ISA

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Authorized officer

Bertram, H

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-C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 617 030 A (R.T. HEATH) 14 October 1986 (1986-10-14) the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/00942

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9301153	A	21-01-1993	CA 2113071 A NO 900395 A EP 0594616 A JP 6511500 T	09-01-1993 30-07-1991 04-05-1994 22-12-1994
JP 03122497	A	24-05-1991	NONE	
JP 59225127	A	18-12-1984	NONE	
US 4617030	A	14-10-1986	CA 1277939 A AU 3508984 A CA 1218234 A EP 0160032 A EP 0207256 A IT 1178008 B JP 61500012 T NO 852115 A NZ 209687 A WO 8501450 A US 4579565 A	18-12-1990 23-04-1985 24-02-1987 06-11-1985 07-01-1987 03-09-1987 09-01-1986 28-05-1985 30-06-1987 11-04-1985 01-04-1986

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 19 October 2000 (19.10.00)	
International application No. PCT/GB00/00942	Applicant's or agent's file reference GRC 5173
International filing date (day/month/year) 15 March 2000 (15.03.00)	Priority date (day/month/year) 24 March 1999 (24.03.99)
Applicant BROWN, Richard, Allen et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
25 September 2000 (25.09.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Olivia TEFY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

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REC'D 11 JUL 2001

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference GRC 5173	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/00942	International filing date (day/month/year) 15/03/2000	Priority date (day/month/year) 24/03/1999
International Patent Classification (IPC) or national classification and IPC C07C7/152		
Applicant BG INTELLECTUAL PROPERTY LTD. et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 25/09/2000	Date of completion of this report 09.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Tragoustis, M Telephone No. +49 89 2399 8623



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00942

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-24 as originally filed

Claims, No.:

1-42 as originally filed

Drawings, sheets:

1/9-9/9 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
☒ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:
see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15,18-20,22-28,30-33,35-41
	No:	Claims	17
Inventive step (IS)	Yes:	Claims	1-15,22-28,30-33,35-41
	No:	Claims	18,19,20

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International application No. PCT/GB00/00942

Industrial applicability (IA) Yes: Claims 1-42
 No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

1. Claim 1 defines an apparatus comprising in series a first separation device for removing gas and/or liquid from a gas and/or liquid and hydrate mixture, and a centrifuge for further concentrating the slurry (=solid hydrate +liquid) received from the first separation device.
Claim 22 defines a device for removing gas from a gas-liquid-hydrate mixture.
Claim 30 defines a device for separating a gas-liquid-hydrate mixture into its three constituents.
Claim 34 defines a device for cooling a slurry hydrate or essentially dry hydrate.
Claims 1,22,30 can be regarded as relating to an apparatus for the treatment of a mixture containing hydrates in order to separate gas and/or liquid from said mixture.
Claim 34 relates to an apparatus, which does not bear any features relevant to the separation of a mixture; this apparatus comprises only features for effecting a cooling of essentially dry or concentrated slurry hydrate.
The apparatus of claim 34 solves a different problem than the apparatuses of the other independent apparatus claims 1,22,30.
Hence there is no single general inventive concept linking the apparatus of claim 34 to the apparatuses of claims 1,22,30 so that lack of unit arises.
- 2.a. Claim 1 is directed to an apparatus for removing fluid from a hydrate-liquid mixture or a hydrate-liquid-gas mixture at an elevated temperature.
The claimed combination of a first separation device followed by a centrifuge in a sealed pressure vessel operating under elevated pressure cannot be found in the documents of the Search Report.
US-A-4617030 relates to the separation of gases and vapours from the liquids present in the well-head gas effluent from natural gas wells. The systems disclosed in this document are designed to operate above gaseous hydrocarbon hydrate temperatures so that no hydrates are formed.
W0 93/01153 discloses a method for the production of gas hydrates and does not pertain to the separation of liquid-hydrates mixtures.
Hence claim 1 and the dependent claims 2-15 meet the requirements of Art. 33 PCT.
Independent claims 22 and 30 are both directed to a device for separating a three phase mixture of hydrate, liquid and gas. Such separation is not touched upon in the documents of the Search Report. Hence claim 22, dependent claims 23-28 as

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EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00942

well as claim 30 and dependent claims 31-33 meet the requirements of Art. 33 PCT.

In claim 35 a hydrate cooling apparatus is defined which comprises a means for supplying a fluidising gas to fluidise the hydrate and a cooling medium passing through the fluidised hydrate.

None of the documents of the Search Report discloses anything relevant to cooling fluidised hydrate.

Consequently claim 35 and the dependent claims 36-41 also satisfy the requirements of Art. 33 PCT.

- b. In claim 17 a method of storing or transporting hydrate is claimed. The only feature of this method defined in claim 17 is that the hydrate is provided in a stable form. Such feature is well known and self-evident since the hydrate must be in a stable form in order to be stored.

The features of claims 18-20 concern straightforward measures which are always taken when storing or transporting hydrates.

3. In claims 22 and 30 it should be specified that the vessels are pressure vessels since hydrates are only present under elevated pressure (Art. 6 PCT).
Claims 16,21,29 are not allowable (Art. 6.2a) PCT).
Reference signs are missing in all apparatus claims (Art.6.2b) PCT).